The prognostic role of clinical features and biomarkers in patients hospitalized with cardiorenal syndromes

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Background: Cardiorenal syndromes (CRS), involving the heart-kidney cross-talk and the activation of neurohumoral and inflammatory pathways, is an entity characterized by high morbidity and mortality.

Objective: To evaluate the prognostic role of risk factors and biomarkers in patients hospitalized for CRS.

Methods: In this prospective, observational cohort study, 113 consecutive patients hospitalized for CRS were enrolled. Socio-demographic characteristics, personal medical history, and prior medication use were recorded upon admission, and echocardiography was performed. Moreover, an array of blood markers were measured. The endpoint of interest was a composite of death or dialysis dependence at discharge.

Results: Patients were classified into two groups; Group 1 (N = 59): discharged being dialysis-independent, Group 2 (N = 54): death/dialysis dependence at discharge. No major differences were detected in baseline characteristics between the two groups. Group 2 patients used renin-angiotensin-aldosterone system blockers (RAASb) less often (Group 1: 69.5% vs. Group 2: 46.3%, p = 0.01) and more frequently presented with oliguria/anuria (Group 1: 28.8% vs. Group 2: 70.4%, p < 0.001) and any infection (Group 1: 33.9% vs. Group 2: 55.6%, p = 0.02). No dissimilarities were noted in echocardiographic markers. Group 2 patients had significantly lower hemoglobin, serum albumin, bicarbonate, and 25-hydroxy-vitamin D (25OHD) (Figure 1). At the same time, N-terminal prohormone brain natriuretic peptide, serum potassium, and parathyroid hormone (PTH) were significantly higher in Group 2 patients (Figure 1). In a multivariate regression analysis, lack of RAASb was independently associated with a 17.7-fold increased risk of death or dialysis dependence at discharge, while the decreasing 25OHD/PTH ratio (β coefficient -0.01, p = 0.007) and increasing admission serum potassium levels (β coefficient 0.82, p = 0.03) increased the possibility of facing the composite endpoint. Following a receiver operating characteristic curve analysis, 25OHD/PTH ratio emerge as the most accurate predictor of facing the composite endpoint, with an ideal cutoff of 103.7 (sensitivity 81%, specificity 74%) (Figure 2).

Conclusion: Lack of prior RAASb use, high admission serum potassium, and a low 25OHD/PTH ratio are associated with poor prognosis in patients hospitalized for CRS.

Figure 1
Figure 2

AUROC: 0.82
p<0.001